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Intra Operative and Post Operative Complications in SICS Patients with Poorly Dilating Pupil

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Abstract

Purpose: To evaluate intraoperative and post operative complications in Small incision cataract surgery in patients with poorly dilating pupil.

Methods: An interventional study done between November 2016 to April 2017 which included patients with poorly dilating pupil (<6mm) after pharmacological dilatation, who underwent SICS under local anaesthesia by same surgeon. Intraoperative and post operative complications were studied. Patients were reviewed upto 6weeks postoperatively.

Results: Total of 60 eyes with poorly dilating pupil underwent cataract surgery. Intra operative complications encountered were zonulardialysis (2 eyes), posterior capsular tear (1 eye), iris trauma (2 eyes). Post operative complications were corneal odema (12 eyes), anterior chamber reaction (6 eyes), irregular pupil (6 eyes), 80% patients had BCVA >6/18.

Conclusion: Surgeons should be aware of the potential complications during cataract surgery in poorly dilating eyes. Caution should be taken at each stage to prevent complication.

Keywords: Intraoperative Complications; Post Operative Complications; Poorly Dilating Pupil.

Introduction

A small pupil is a relatively common problem experienced during cataract surgery. It has been shown that about 1.6% of cases will fall into this category. The small pupil can impede visualization and make instrumentation into the eye more difficult. Eyes complicated by Pseudoexfoliation [1] with small pupil likely to cause lot of intraoperative and postoperative complications.

Many patients who present for cataract surgery have eyes complicated by pupils with iris sphincter sclerosis due to aging, synechiae, previous trauma or surgery, diabetes, iridoschisis, uveitis, chronic miotic therapy, pseudoexfoliation, or other issues may cause a pupil to dilate poorly. The small pupil (less than 3.0mm or middilated pupil < 6mm) can impede visualization and make instrumentation into the eye more difficult. A well-dilated pupil with a sharp red reflex enhances the ease of cataract extraction and decreases the likelihood of complications like iris sphincter tear, bleeding, ruptured posterior capsule and loss of the nucleus. Lens insertion can be more difficult and visualization of the haptics and the IOL position difficult to evaluate. The postoperative result of these encounters can be an irregular and atonic pupil, photophobia and discomfort for the patient decreased VA. This study is done to evaluate the intraoperative and postoperative complications with small incision cataract surgery in patients with poorly dilating pupil.

Material and Methods

This was an interventional study conducted in department of ophthalmology, NMCHRC, Raichur .

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The study was done for a period of 6months between Nov 2016 to April 2017. A total of 60 patients admitted for cataract surgery with poorly dilating pupil (<6mm) after pharmacological dilation with tropicamide and phenyephrine 0.5% eye drops of age above 50years of either sex were included in the study.

Exclusion criteria werepatients with a history of chronic miotic use, traumatic cataract, complicated cataract, lens induced glaucoma, high myopia and previous ocular surgery and insufficient followup cases.

Institutional ethics committee clearance was obtained before the start of the study.

All patients underwent detailed preoperative ocular examination including clinical history and systemic examination, measurement of uncorrected and best corrected visual acuity , intraocular pressure (IOP) by Goldmannapplanation tonometry. A-scan biometry was also used to measure the power of the cornea (keratometry) and axial length of the eye, and using this data to determine the ideal intraocular lens power. Detailed slit lamp biomicroscopy under maximal mydriasis was performed to assess cause of poorly dilating pupil (<6mm) like pseudoexfoliative material on the anterior capsule of lens, pupillary border,posterior synechia, type and grade of cataract, and the presence of phacodonesis or zonulolysis. Cataract was graded using "lens opacity classification system" Gonioscopy was done and the angle was graded by Shaffer's system of grading. A detailed fundus examination was conducted with slitlamp biomicroscopyusing+90D and indirect ophthalmoscopy using +20D lens. All observations and demographic data were carefully recorded using a protocol sheet.

Prophylactic antibiotics drops moxifloxacin 0.5% eye drops started one day before surgery. Patients were dilated with tropicamideand phenylephrine 0.5% eyedrop and non-steroidal anti-inflammatory drops flurbiprofen sodium 0.03% was used 3 times every 15 minutes to maintain the dilatation

Surgical Technique

All patients underwent small incision cataract surgery by experienced surgeon.

After peri-bulbar block with 5 ml of with2% lignocaine with adrenaline (1: 20, 0000)with 150 units/ml of hyaluronidase. Povidine-iodine 5% was instilled into the conjunctival sac. For SICS a fornix base conjunctival flap was made, scleral incision was made with bard parker knife with 15 no. blade temporally or supero-temporally and sclerocorneal tunnel was constructed with crescent. Continuous curvilinear capsulorhexis (CCC) aimed at 5mm to 5.5 mm was done using the needle cystitome. Small pupils were managed with multiple sphincterotomies, viscomydriasis, intracameral adrenaline. A thorough hydrodissection was performed to separate cortex from nucleus. Nucleus was delivered by visco expression. Irrigation and aspiration was done with Simcoe's two way irrigation and aspiration cannula. Rigid, single piece, biconvex, polymethyl meth acrylate posterior chamber intraocular lens (IOLs) with optic diameter of 5.25 mm was implanted in bag.

Intraoperative and Post Operative Complications were Noted

Post-operatively, patients were put on topical antibioticsand steroids tapered over 4-6 weeks depending upon the post operative inflammation. Patients were followed on the post-operative day 1, day 7 and day 14 and at weekly intervals for 6weeks to evaluate intraocular pressure spikes, presence of intraocular inflammation, decentration/tilt of intra ocular lens and corneal odema. Postoperative uncorrected visual acuity was recorded every week and best corrected visual acuity was recorded at 6th week.

Results

A total of 60 eyes of 60 patients with poorly dilating pupil underwent small incision cataract surgery by experienced surgeon after pharmacologically dilating with tropicamide and phenylephrine 0.5% eye drop.

Of 60 patients, 35 (58.33) were females and 25 (41.66%) were males. The ages of 60 patients in this study was between 50 and 70 years. Out of these 22 (36.66%)were in 50-60year age group and 38 (63.33) were in 60-70year age group. Out of 60 patients 6 (10%) had pupillary diameter of < 4mm, 20 (33.33%) had pupillary diameter between 4-5mm, 34 (56.66%) had pupillary diameter between 5-6mm after pharmacologically dilating with tropicamide and phenylephrine 0.5% eye drops. 16 (26.66%) eyes had nuclear sclerosis, 10(16.66%) had cortical cataract and both nuclear sclerosis and cortical cataract was present in 34 (56.66%) eyes. Mean intraocular pressure (IOP) was 18.23±2.10 mmHg.

Pre-operative features showed that a high percentage of eyeshad a rigid pupil. None of the

pupils dilated beyond 6mm. Almost all eyes showed some evidence of pigment dispersion mainly on the anterior surface of the lens and cornea. None of the eyes showed frank subluxation of lens

All patients underwent cataract surgery using SICS technique. Surgical complications are listed in [Table 1]. 6 (10%) cases required sphincterotomy to facilitate capsularhexis andnucleus delivery. Zonular dialysis seen in 2 (3.33%)cases, posterior capsular tear with vitreous loss seen in 1 (1.66%) due to difficulty in surgical maneuvers,iris trauma occurred in 2 cases (3.33%).

Patients were followed on thepost-operative day 1, day 7, day 14 and at weekly intervals for 6weeks to evaluate intraocular pressure spikes, intraocularin flammation, decentration/tilt of intraocular lens and corneal odema.

Post-operative hazy cornea (corneal odema) was seen in 12 (20%) cases. Anterior chamber reaction in 6 (10%)cases, irregular pupil seen in 6 (10%) cases [Table 2].

The IOP was measured both pre-operatively and postoperatively. We did not find any pressure spikes in any patient. Final visual acuity was recorded after 6 weeks of surgery [Table 3]. At the end of 6 weeks, 3 (5%) patients showed persistent corneal edema probably due to corneal decompensation. However, pre- or post-operative specular microscopy and pachymetry were not included in this study.

48 (80%) cases had visual acuity between 6/6 – 6/18, 9 (15%) cases had visual acuity between 6/18-6/60, 3 (5%) cases had visual acuity less than 6/60.

Table 1: Intraoperative complications

Intraoperative complications	Number of cases	PD <4mm	P	PD 4-5mm	P	PD 5-6mm	P	TP
Zonular dialysis	2	2	3.33%	0	0	0	0	3.33%
Posterior capsular tear with vitreous loss	1	1	1.66%	0	0	0	0	1.66%
Iris trauma	2	1	1.66%	1	1.66%	0	0	3.33%

PD: pupillay diameter. P: percentage. TP: total percentage

Table 2: Post-operative complications

Post operative complication	Number of cases	PD <4mm	P	PD 4-5mm	P	PD 5-6mm	P	TP
Corneal odema	12	6	10%	4	6.66%	2	3.33%	20%
Anterior chamber reaction	6	3	5%	2	3.33%	1	1.66%	10%
Irregular pupil	6	6	10%	0	0	0	0	10%

Table 3: Final visual acuity

Visual acuity	Number of cases	PD <4mm	P	PD 4-5mm	P	PD 5-6mm	P	TP
6/6-6/18	48	3	5%	10	16.6%	35	58.33%	80%
6/18-6/60	09	5	8.33%	3	5%	1	1.66%	15%
<6/60	03	3	5%	0	0	0	0	5%

PD: pupillay diameter. P:percentage. TP: total percentage.

Discussion

Poorly dilated pupil is one of the most common problems faced by cataract surgeons and is associated with a higher incidence of Intraoperative complications such as capsular rupture and vitreous loss .

There are many causes of poor pupil dilatation e.g. diabetes mellitus, senile miosis, intraoperative floppy iris syndrome, pseudoexfoliation syndrome, uveitis with posterior synechiae and some conditions after ocular surgery.

Certain eyes are at a higher risk of complication during cataract surgery. Operations on such 'high-risk' eyes are also more likely to yield a poor visual outcome (defined as best corrected vision less than 6/60 after surgery) [2].

Learning to recognise when eyes are at greater risk, and acting accordingly, will help you to avoid

complications. Even so, before the operation takes place, it is good practice to explainto such patients that a poor outcome is a possibility. This makes these patients' expectations more realistic and improves postoperative compliance and follow-up.

A prospective study of risk factors in cataract surgery, carried out on one thousand extracapsular cataract extractions, showed decreased pupil size to be the only significant risk factor for vitreous loss. Zonular breaks were also more common with decreasing pupil size [3].

A high rate of capsular rupture has also been reported in diabetic eyes undergoing cataract extraction [4,5].

Some of the major cause of poorly dilating pupil in our study include pseudoexfoliation, rigid pupil, senile miotic pupil, pupil in diabetic patients.

PXE is a relatively common finding in elderly patientsundergoing cataract surgery, but pre-operative detection may be missed if the eyes are not seen under slit lamp. Direct signs of zonule instability such as lens subluxation, zonular dialysis, iridodonosis or phacodonosis should be carefully looked for pre-operatively. Often the earliest sign is a subtle iridodonesis. It is best assessed prior to the pupillary dilatation while lens related changes are best seen after dilatation [6]. One study reported that an axial anterior chamber depth of less than 2.5 mm increased risk of surgical complications five fold [7]. The amount of exfoliative material in the zonules does not seem to be predictive of intra operative zonule weakness [8].

In our study Out of 60 patients 6 (10%) had pupillary diameter of <4mm, 20 (33.33%) had pupillar diameter between 4-5mm, 34 (56.66%) had papillary diameter between 5-6mm.

In the present study, most frequent problem encounteredwas a rigid pupil and none of the pupils dilated more than 6mm in spite of use of standard mydriatic drops. We resorted to sphincterotomy, viscomydriasis, intracameral adrenaline but other alternatives include bimanual stretching and use of iris hooks or flexible iris retractors are also possible. Sphinterotomy and stretching have the disadvantage of causing post-operative distorted pupil, which may even lead to the pupillary capture.

Intra operative complications encountered were Zonular dialysis in 2 (3.33%) cases, posterior capsular tear with vitreous loss in 1 (1.66%) cases due to difficulty in surgical maneuvers, iris trauma occurred in 2 (3.33%) cases. Post-operative hazy cornea (corneal odema) was seen in 12 (20%) cases. Anterior chamber reaction in 6 (10%) cases, irregular pupil seen in 6 (10%) cases. After 6 weeks 48 (80%) cases had visual acuity between 6/6 – 6/18, 9 (15%) cases had visual acuity between 6/18-6/60, 3 (5%) cases had visual acuity less than 6/60. We did not encounter complications like decentered IOL, retained cortical matter, postop hyphema as seen in other studies.

Similar results were obtained in a study conducted by Pranathi, et al cataract surgery in pseudoex foliation [9] were out of 52 cases operated zonular dialysis was seen in 2 (3.8) cases, Posterior capsule rupture was seen in 4 (7.7%) cases, Post-operative hazy cornea was seen in 12 (23%) cases.

In a study conducted by BC. Hemalatha, SathyendranathB Shetty [10] on 50 eyes with pseudoexfoliation who underwent cataract surgery Intraoperative complications encountered during surgery were; zonular dialysis in 3 cases, posterior capsular tear in 2 cases, out of these 5 cases vitreous loss was seen in 3 cases. Postoperative complications were corneal odema in 17 cases, of which endothelium de-compensated in one case, while early posterior capsular opacification was seen in 6 cases. Final best corrected visual acuity was between 6/6-6/12 in 39(78%) eyes, 6/18 -6/36 in 6(12%) cases; 6/60 to less in 5(10%) cases.

In another study conducted by Islam, et al on 512 eyes with pseudoexfoliation and cataract surgery complications [11] encountered were iridodialysis in 6 (1.17%), zonular dialysis in 7 (1.36%) posterior capsule rupture with vitreous loss in 14 (2.73%), retained cortical matter in 44 (8.59%), and decentered intraocular lens 23 (4.49%) cases,post operative hyphema in 6 cases (1.17%), there was significant intraocular inflammation in 61 (11.91%) cases and corneal decompensation in 23 (4.49%) cases.

Posterior chamber intraocular lens (PC-IOL) implantation is a common technique for managing senile and diabetic cataract. The incidence of complications following extracapsular cataract surgery is still higher in diabetic patients than in nondiabetics. More pigment dispersion, fibrin reaction, posterior synechiae and transient iridal vascular congestion was found by Krupsky et al. (1991) [12]. More postoperative inflammation in diabetic patients has also been reported (Cunliffe et al. 1991) [13].

A small resting pupil is often found in diabetic patients (Smith & Smith 1983) [14]. Also, the mydriatic response is weaker in diabetic patients as compared to controls after topical application of an anticholinergic drug (Huber et al. 1985) [15]. However, a combination of anticholinergic and

adrenergic drugs provides good mydriasis in diabetic cases (Huber et al. 1985). Progressive miosis induced by surgical trauma occurs frequently during extracapsular (Psilas et al. 1992)

Conclusion

Although cataract with poorly dilating pupil is a challenging scenario to operate upon, a proper pre-operative assessment and case based management plan is required as the magnitude of problems may vary from patient to patient. It is possible to achieve good results in most patients by taking adequate preoperative precautions and readiness to handle intraoperative complications.

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